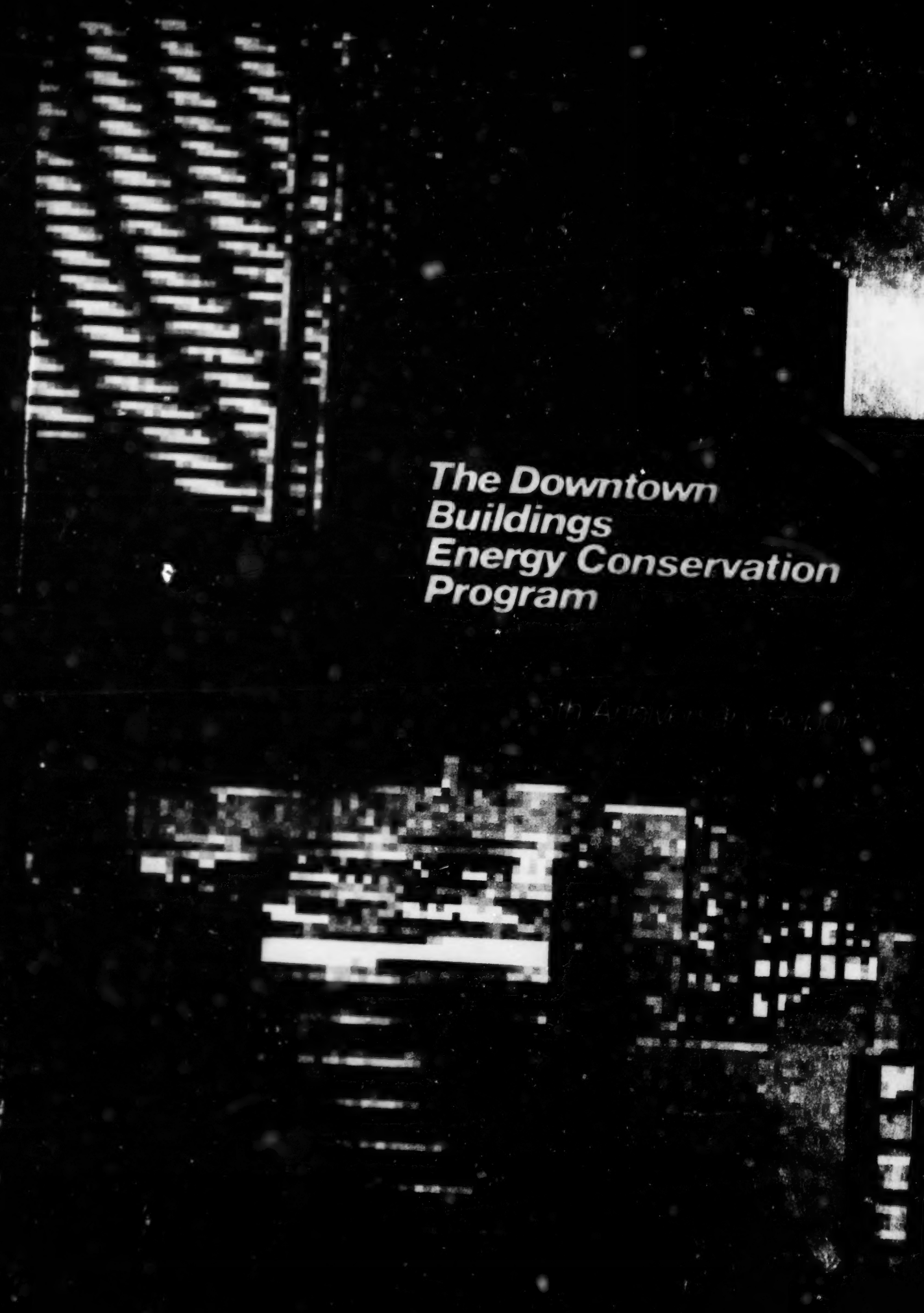

The Downtown
Buildings
Energy Conservation
Program

December 1, 1982: 5 p.m.

Some skyscrapers left their lights on constantly until a few years ago. Now many major building owners are incorporating energy management into their operating procedures, as the inside back cover shows.

Ontario

The Premier
of Ontario

Parliament Buildings
Queen's Park
Toronto, Ontario
M7A 1A1

I am pleased to have this opportunity to express my best wishes on the fifth anniversary of the Downtown Buildings Energy Conservation Program.

The expectations and hopes I had when I launched this program in 1978 have been more than surpassed through the dedication of the participating companies.

They have shown that they are good corporate citizens, and I am sure they will continue to demonstrate outstanding leadership in the field of energy management both to the major building sector and the community at large.

I am confident that the results achieved during the past five years will serve as the basis for even greater energy efficiencies in the future; and that this program will serve as an important model for other commercial building owners and managers across Ontario and the rest of Canada.

William G. Davis

Ontario

Energy
Ontario

Minister

Ministry
of
Energy

Queen's Park
Toronto, Ontario
M7A 2B7
416/965-4286
Telex 06217880

I congratulate the organizations and individuals that have made the Downtown Buildings Energy Conservation Program so successful. It would not have been possible without their enthusiasm and the strong commitment at the executive level.

As the Minister responsible for the administration of the program, I take great pleasure in presenting this special report which highlights five years of co-operative activities and energy management achievements.

One of the program's most encouraging features is that, with little government expenditure, participating companies have saved millions of dollars in energy costs. Everyone wins – participating companies save money and the energy conserved benefits all of us.

I thank every participant in the program for helping Ontario set a precedent in energy-wise building operation in both the private and public sector. By making our larger buildings more energy efficient, Ontario takes another major step towards a secure energy future.

Philip Andrewes
Minister of Energy

A Message from Ontario Hydro

The energy management philosophy is as important now as ever, because energy savings mean dollar savings.

Further energy gains are not achieved so easily once basic energy management measures have been taken. Naturally, the most cost-effective and simplest measures are taken first. Additional savings require significant capital investment and, frequently, advanced energy management technologies.

At Ontario Hydro we see it as part of our responsibility to encourage wise and efficient use of all forms of energy. Sometimes this means substituting electricity for other energy forms – particularly oil.

We believe that the wider – but wiser – use of electricity will be increasingly attractive to building owners and managers in the future because the price of electricity will be more stable than that of other energy forms.

In the next few years, Ontario Hydro is going to be expanding its contact with building operators – as with all of our customers – to identify ways to use energy more effectively and to make additional savings.

We will continue to support the Downtown Program's focus on wise energy use. We will be calling upon building owners and managers to share their ideas and experience with us so we can better meet their energy needs, and help them contribute to the achievement of federal and provincial off-oil objectives.

Milan Nastich
Chairman and President

A Message from the Building Owners and Managers Association

I wish to extend my congratulations on the fifth anniversary of the Downtown Buildings Energy Conservation Program.

The following report is an impressive story. It tells what happened when a group of downtown Toronto and Ottawa building owners, managers and tenants got involved in an energy saving program.

By avoiding unnecessary energy costs, they were able to substantially reduce operational expenses – and anyone involved in business today knows how important that can be.

There is no doubt that office skyscrapers pose significant energy conservation challenges which are as varied as the designs of the buildings themselves. But careful planning, imagination and dedication can result in cost-effective solutions that end up saving thousands of dollars.

As well, we can't overlook the fact that conventional oil reserves are being depleted. Careful energy management is a key to ensuring a secure energy future for all Canadians.

As president of the Toronto chapter of the Building Owners and Managers Association (BOMA), I would like to offer my sincerest congratulations to all those who have contributed to the program's success, and especially to the Ontario Ministry of Energy for organizing the program during the past five years. I look forward to our continuing association with the ministry.

Jack McVicar
President
Toronto Chapter

The First Five Years

"We believe existing buildings can reduce (energy) consumption by up to 30 per cent without significant or expensive structural changes. That's what we achieved in some of our government buildings. This should be your target – at least 30 per cent reduction from 1973 levels, measured in energy consumption per square foot. That's the kind of commitment we would like from you."

William G. Davis
Premier of Ontario
April 4, 1978

The initial response to Premier Davis' challenge was excellent. By the end of the first year, 26 companies had pledged their support and co-operation. By the end of the second year, the number had grown to 34. Within three years, the program had expanded to include Ottawa.

Today, five years later, the response is still growing as energy costs become a more significant – and more easily controlled – aspect of every corporate budget.

The overall cost of energy has increased 84 per cent since 1978. But that doesn't mean that overall corporate energy expenses have to rise by the same percentage.

In fact, the 51 participants in the Downtown Energy Conservation Program in Toronto and Ottawa have minimized or even reversed the growth of their energy costs through wise energy management, and saved millions of dollars in the process.

$8,750,000 – *the typical annual energy costs of five large office buildings. That's how much the corporations in the Downtown Buildings Energy Conservation Program saved last year.*

Program Development

Although large office and commercial buildings have traditionally used – and wasted – large amounts of energy, few people were concerned when energy was cheap and plentiful. Suddenly in the 1970s, things changed.

In 1976, responding to the pressure of rising energy prices, Ontario launched the Energy Management Program for government buildings.

Pilot projects like the retrofit of the Ontario government's London Court House were a resounding success, reducing energy costs by 70 per cent in five years. Now, because of the program, many new buildings such as the court house in Barrie have been designed with built-in energy efficiency features.

The government's own Energy Management Program has been very successful – so successful that the original energy conservation target of 15 per cent by 1979-80 was raised to 26 per cent by 1985-86. As more and more of Ontario's 5,000 government buildings become energy-efficient, these kinds of savings will undoubtedly have a significant impact on the public purse.

Saving money in the operation of government buildings makes a lot of sense. Corporations such as Gulf Oil, Bell Canada and Mount-Batten Properties began to think so shortly after the government buildings program was launched in 1976, and followed suit by initiating similar programs of their own.

Lights out

Initially, however, these programs didn't seem to have much of an impact on Toronto's blazing night skyline. It still looked like energy was being wasted, and the public was skeptical that anything was being done. The ministry received calls and letters asking why major downtown buildings were leaving their lights on at night.

As professional engineers know, leaving lights on all night is not necessarily more wasteful than turning them off. In 1978, few existing office buildings were being operated with energy efficiency in mind and many wasted up to 50 per cent of the energy they consumed.

The downtown program's task was to transform a host of energy-wasting buildings into energy-efficient buildings through the co-operation and participation of building owners and managers.

Dollars and sense

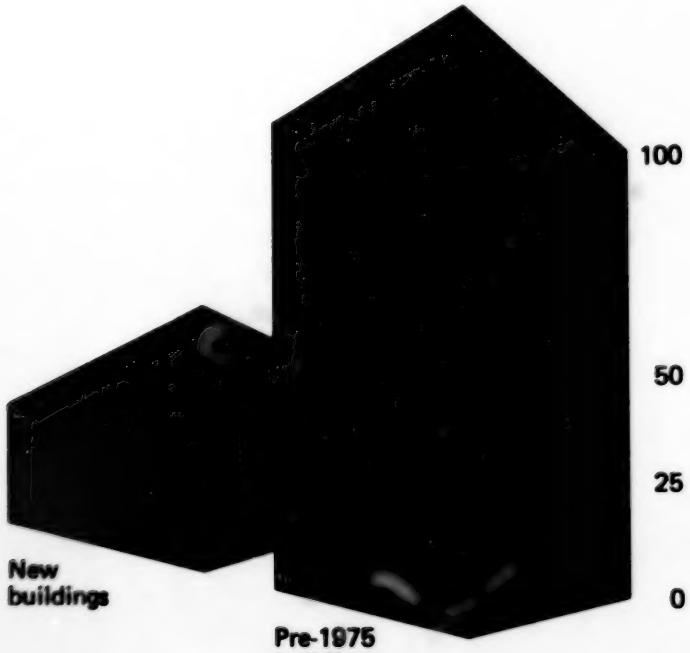
In 1978, the government launched a voluntary program – the Downtown Buildings Energy Conservation Program – to encourage the private sector to trim its energy consumption in commercial buildings by experimenting with innovative building operation techniques and reporting on the findings.

The companies participating in the program have since made substantial savings, and they reap the incalculable benefits of good corporate citizenship.

And people have worked together, sharing their experiences and knowledge with other participants. Many private sector participants have been enthusiastic enough about the results to encourage other landlords to take action too. Furthermore, the excellent results have boosted the credibility of energy management within the business community.

Improvements in Energy Efficiency of Building Design - 1970s vs Today

Energy-efficient new building design requires only 25 per cent of the energy consumed by its forerunners. Typically, an older building wastes half of the large amount of energy it consumes.



Getting energy-wise

The program is quite straightforward. First the Ontario Ministry of Energy seeks a voluntary commitment, from the private business community at the executive level, to develop, maintain and monitor energy conservation procedures in the operation of commercial and public buildings.

Upon joining the program, a private company sets its own conservation goals. With government advice and encouragement, and frequently with advice from other participants, the company then chooses and implements cost-effective operational measures and/or capital investments. After this, dollar savings are just around the corner.

All participants adopt the following five-point program:

1. Each organization appoints a senior executive who is responsible for conservation.
2. Members participate in workshops and case studies with utilities and Ontario Ministry of Energy personnel.
3. Each participant sets corporate objectives for reducing energy consumption.
4. Each organization reduces after hours lighting levels and reschedules maintenance and other operating procedures to correspond to the new reduced lighting hours.
5. With the assistance of the Ontario Ministry of Energy, utilities and other government agencies, the members develop recording systems to determine actual savings for comparison with established targets.

In the section beginning on page 9, the companies comment on the success of their respective experiences with energy-wise building management.

The Downtown Energy Forums

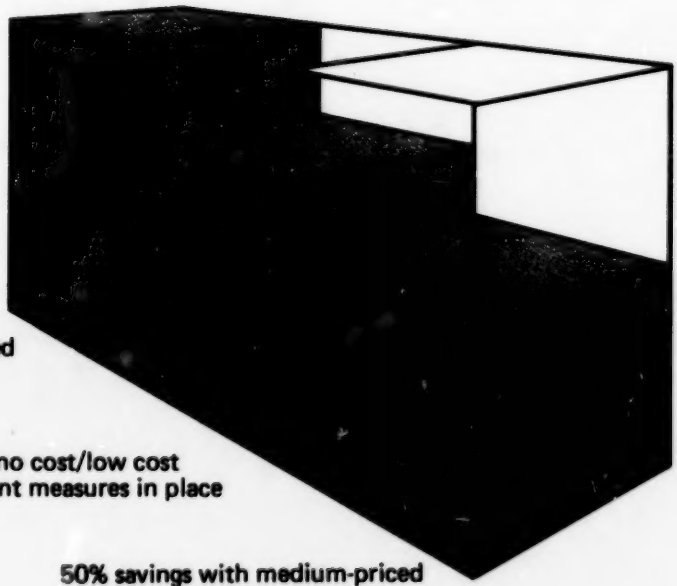
Ottawa and Toronto participants in the Downtown program each convene once a year in their respective cities to learn about recent developments in buildings energy management, and to review case studies.

Municipal governments in both cities have demonstrated an interest in conservation among downtown buildings by providing City Hall meeting space for the 1983 forums.

Addresses by professionals in various fields are a valuable resource for participants. Recent Forum topics include new concepts in central building computers; the impact of future leasing practices on energy management in buildings; and the relationship of employee motivation to physical plant management.

Five Toronto and three Ottawa forums have been held to date.

Energy Consumption Reduction through Energy Management



Energy consumption in typical buildings designed before 1975

30% savings with no cost/low cost energy management measures in place

50% savings with medium-priced and major capital equipment investments also in place

Energy Management Success Stories

Seven participants comment on saving energy:

Commerce Court

At Commerce Court, the Canadian Imperial Bank of Commerce's downtown landmark;

". . . we removed half of the lighting fixtures in the bank area," says Jack Martin, Assistant General Manager, Real Estate, "and reduced the size of many of the ones we still use.

"We turn off most of the elevators at night, and shut down the escalators. We have also turned off our automatic snow melting equipment, it now is manually operated, and reduced the running time of the equipment.

"The tenants are co-operating, but we have our security force check the lights during their rounds.

"What we've done, really, is a number of minor things – but they add up. We've cut our monthly energy bill by 25 per cent; that's a savings of $40,000 a month.

Metropolitan Life

Other companies have also learned how apparently minor conservation actions add up to major savings. At Metropolitan Life's Metropolitan House in Ottawa, Buildings Manager Earl Mather reports:

"We reduced light levels from 120 to 80 foot candles by taking out about half the lighting tubes. Reducing the lighting levels also lowers cooling needs, and we now take in more fresh air through interior fans to reduce cooling cost.

"We have also reduced the hot water temperature in washrooms from 60° to 43° C (140° to 110° F), and reduced the running hours of all machinery and air conditioning equipment.

"Based on the usage estimates in the original design, we figure that we've saved $229,000 in electrical energy from 1977 to 1981."

City of Toronto

The City of Toronto is busy keeping the cost of operating city-owned buildings to a minimum. The City Auditor's office represents the city in the Downtown program. Bill Campbell, the city's Energy Auditor, says:

"We've been working on energy conservation since 1971. It's especially noticeable at City Hall, where we use only two types of energy – steam for heat, and electricity for everything else.

"In 1971, we used 29 million kilograms (64 million pounds) of steam for heating. We've made great progress there. Over the past five years we've averaged 13.2 million kilograms (29 million pounds) a year, and it was as low as 10.2 million kilograms (22.5 million pounds) one year. The reductions stem from City Council recommendations to adopt low-cost and no-cost energy conservation measures, such as setting back temperatures in winter, reducing temperatures in unoccupied areas and over weekends, and setting temperatures forward in the summer.

"We have also developed a more efficient distribution system, insulated the steam pipes and, since so much of the City Hall is glass, invested in thermal-efficient insulating drapes.

"Removing unnecessary lights cut electrical consumption from 32 million kW hours in 1976 to 27 million kW hours in 1981.

"All of this has saved energy and money. Our cost avoidance at City Hall alone from 1976 through to the end of 1983 is estimated to be $1.5 million. And when we look at the 250 other municipal buildings, we forecast total energy savings of $4 million over the same period."

Olympia & York

Olympia & York Development Ltd. wanted a computerized lighting control system for its 72-storey First Canadian Place, where 222,960 square metres (2.4 million square feet) of office space is leased to 200 tenants.

"Each floor is approximately 2,790 square metres (30,000 square feet)," says Olympia & York's Chief Engineer, Joe Bauer, "and what we had previously was one light switch that controlled an entire floor, All it took was for one person to come in early or stay late to light up the entire floor. We now have each floor divided into 25 separate zones; each with its own switches.

"The lights are now set according to the tenants' hours. But when someone does come in early, or stays late, all they have to do is dial a telephone number and press a coded number to have the lights turned back on in that specific zone.

"We have also adopted new cleaning procedures. Instead of having all the lights on when a floor is being cleaned, the cleaners do a floor quarter by quarter, and turn on only the lights of the quarter they are working in."

The custom-designed system cost Olympia & York $259,000, but Joe Bauer reports that it paid for itself after two years of operation.

Gulf Oil

Gulf Canada has turned to computers to help cut energy costs at its Mount Pleasant Road building in Toronto, reports Building Superintendent John Bone:

"We've been reducing the kilowatt hour consumption by controlling it with a microprocessor since October of 1981.

"We've also attacked the kilowatt demand. An energy survey made by an energy management company showed a power loading of about 38 watts per square metre (4 watts per square foot) at the end of 1982. We're reducing it. In fact, we want to cut it in half. Our goal is 19 watts per square metre (2 watts per square foot) by the end of 1985.

"We are using phantom tubes to reduce overall lighting, energy-saving ballasts and tubes, and cleaning all the light fixtures as well. We'll be doing one third of our building each year until we reach our target."

Cadillac Fairview

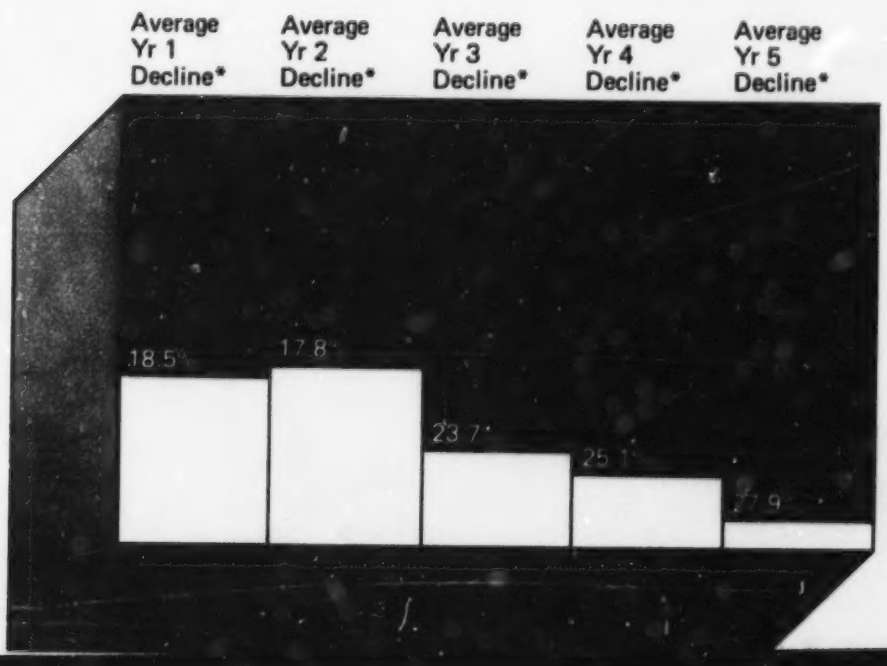
At the Toronto-Dominion Centre, Cadillac Fairview has found that constant and consistent monitoring of energy usage, plus attention to detail, are essential to reduce energy consumption, according to Bill McDonald, Manager, Office Building Operations:

"We really started getting serious about saving energy with the onset of the energy crisis in 1974, and have been chipping away at it ever since.

"Our success has been achieved largely through the implementation of numerous small measures, each of which has contributed to a significant overall saving. Examples of these measures would be the elimination of reheat where possible, the installation of energy-efficient fluorescent lamps and ballasts, the introduction of more sophisticated lighting controls and reducing systems, operating hours.

"Most importantly, we are accomplishing these savings without compromising tenant comfort."

Five Years of Reduced Energy Consumption by Downtown Program Members



Energy Management Workshops

Ontario Ministry of Government Services

The Government of Ontario is also saving energy and money in the 40 different office buildings it operates in downtown Toronto. Tony Grabowski, Chief Systems Engineer for the Property Management Division of the Ministry of Government Services, reports:

"Having 40 different buildings, ranging in age, style and purpose from the Queen's Park office complex to the 361 University Avenue court house, has made the job quite a challenge.

"But we're succeeding. So far, we've reduced total energy consumption in all 40 buildings by more than 22 per cent, and had saved more than $1.2 million by the end of 1981-82. And we'll do even better next year.

"Our Energy Management Program for existing government buildings has involved taking low-cost measures, such as making changes in building operations including reducing ventilation rates and lighting levels where possible.

"In addition, through capital expenditures, we've modified heating and ventilation systems, installed heat recovery equipment and made environmental control changes. We also monitor energy consumption and hold workshops for building operators, where we discuss energy-conserving techniques and analyse common problems. The information gained at the workshops is very constructive."

Periodically, technical personnel from the Ministry of Energy, and gas and hydro utilities, present workshops on building operation techniques. Participants in the Downtown program receive detailed information on such topics as monitoring fuel combustion and managing electricity use. Question and answer sessions allow particular problems to be analysed from a cost/benefit approach.

The Ministry of Energy also offers free on-site energy management workshops for specific groups.

The Office Building of Tomorrow

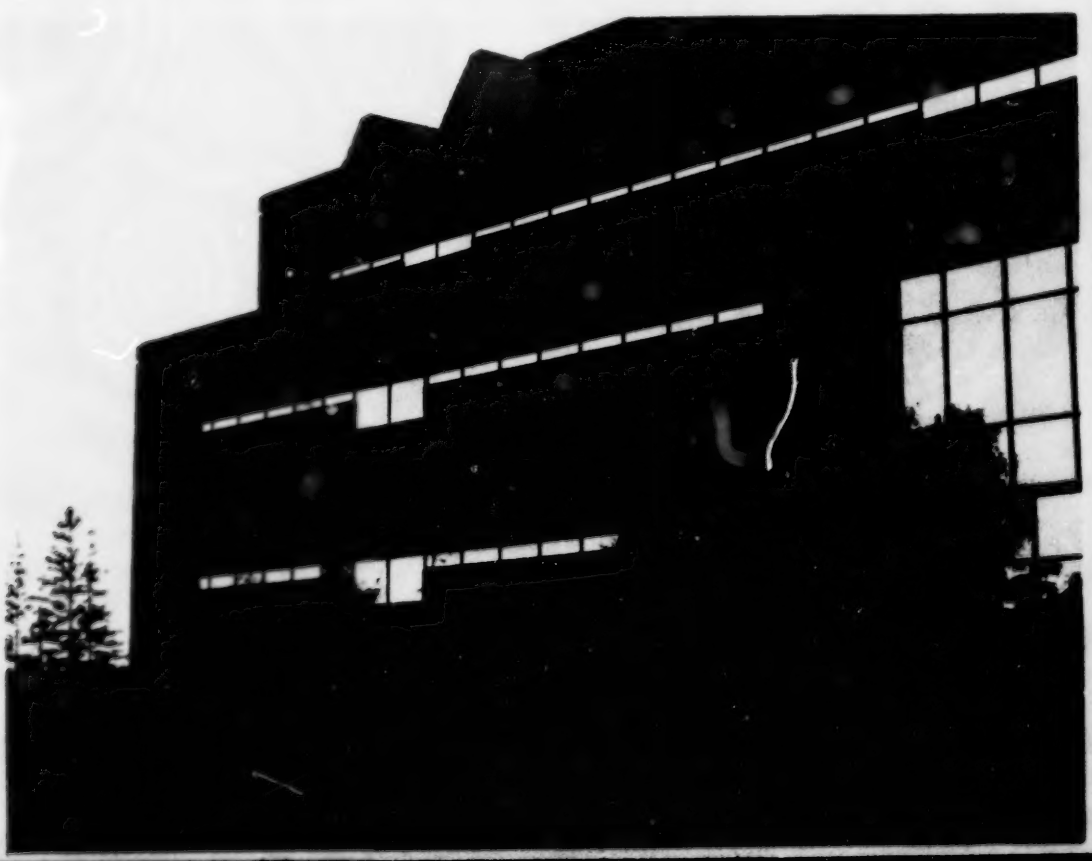
Not all energy savings ideas are as easy and inexpensive to implement as some of the ones described in this report. While 'no cost/low cost' measures are the sensible way to begin an energy management program, investment in capital equipment is normally required to maximize potential gains.

Each company must choose the most cost-effective strategy. Innovative financing is being developed as investors realize that high initial capital investments in energy-efficient building features pay for themselves with the energy dollars saved.

Ottawa Mayor Marion Dewar referred to the shifting direction of building design and construction in her keynote address at Ottawa's Downtown Forum in May 1983:

"The downtown core, as the heart of a city, presents more opportunities for energy conservation to be practiced and be seen to be practised, than perhaps any other part of the urban structure.

"Moreover, it is opportunities in energy management that present themselves downtown, rather than mere energy conservation. By energy management I mean the design of buildings, transport networks and building complexes that will automatically minimize the consumption of energy by business and the citizenry, rather than leaving it to energy conservation to be applied as an afterthought..."



Today, built-in energy efficiency features are becoming an important consideration when a company decides to move or build new quarters.

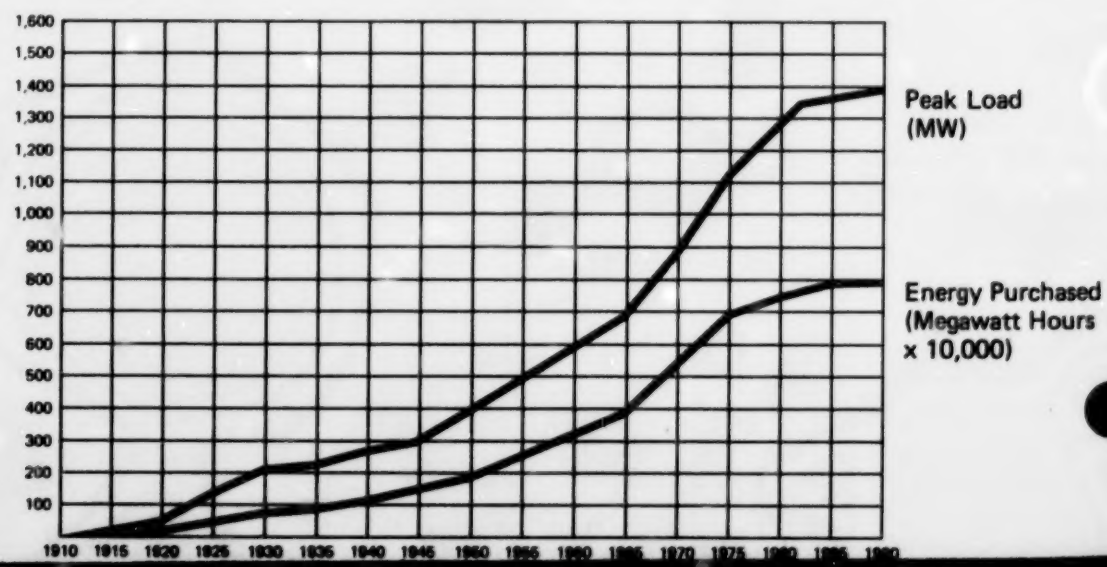
As a result of energy-efficient design and operation, many of today's buildings use 75 per cent less energy than their 10-year old counterparts. In less than one decade, architects and engineers have made major energy-saving advances.

A new office building put up by A.E. LePage Limited is a good example. It is clad in reflective insulated glass which reduces heat loss and prevents heat gain. A continuous curtain wall ensures minimum air penetration through a tight exterior skin – not possible with precast construction. An atrium provides a low ratio of perimeter surface area in relation to floor area.

The Bell Canada Trinity Square project shows how innovative technology in the fields of architecture, engineering and energy management can come together. The building is designed to operate on less than one third of the energy consumed by most comparable commercial buildings. Lighting and fans, rather than heating, have become the main energy consumer.

Toronto Hydro-Electric System
Peak Load and Energy Purchased

For the first time since the Thirties, Toronto's growth in energy demand and consumption has slowed down. If the trends of the last decade were in force today, Toronto would now be increasing its energy use by five to seven per cent a year.



Getting the Energy Conservation Habit

Even though the Downtown program applies only to downtown buildings in Toronto and Ottawa, its impact is far reaching. Ontario has received requests about the Downtown Energy Forums from Manitoba and other parts of Canada, as well as from the U.S., Europe and Japan.

The effects of the program are also being felt in the personal lives of people working in these buildings.

The key to many simple energy-saving techniques is simply *remembering* to use them. And people saving energy at work tend to bring their habits home. To encourage this tendency, companies such as the Bank of Nova Scotia have developed their own employee motivation programs. Ontario Hydro's TRIM program and the Ontario government's BEST (Big Energy Saving Team) program teach employees to be energy-conscious through a variety of incentives.

Summing It Up

The organizations which participated in the first five years of the Downtown Buildings Energy Conservation Program have responded enthusiastically to Premier Davis's call for responsible corporate citizenship and have demonstrated the truth behind the premier's original statement:

"I don't believe the development of a conservation ethic is the government's job alone. Conservation can be a profitable exercise, as many businessmen have already discovered."

William G. Davis
Premier of Ontario
April 4, 1978

Not only have many participating organizations inspired other organizations and corporations to follow their example, they have also shown that energy conservation saves money.

Further Information

For more information on buildings energy conservation, including case studies on government building success stories and the government's energy standards for new and existing public buildings, contact the Ontario Ministry of Energy, 56 Wellesley Street West, Toronto, Ontario M7A 2B7.

The Participants

A growing list of companies and agencies form the backbone of the Downtown Buildings Energy Conservation Program. Voluntarily, they monitor their energy costs and attempt to reduce consumption through adjustments in building operation routines.

Toronto

ADASON PROPERTIES LIMITED
A.E. LEPAGE
THE BANK OF MONTREAL
BELL CANADA
THE CADILLAC FAIRVIEW CORPORATION LIMITED
CAMPEAU CORPORATION
CANADA PERMANENT TRUST COMPANY
CANADA SQUARE CORPORATION
THE CANADIAN IMPERIAL BANK OF COMMERCE
CITY OF TORONTO
CN RAIL
CONFEDERATION LIFE INSURANCE COMPANY
CROWN LIFE INSURANCE COMPANY
FIDINAM (CANADA) LIMITED
GEORGE WESTON COMPANY
GLOBE REALTY MANAGEMENT
GULF CANADA LIMITED
HORIZON DEVELOPMENTS
IMPERIAL OIL LIMITED
INDEPENDENT ORDER OF FORESTERS
MACLEAN HUNTER LIMITED
MANUFACTURERS LIFE INSURANCE COMPANY
MARATHON REALTY COMPANY LIMITED
MARKBOROUGH PROPERTIES LIMITED
MOUNT BATTEN PROPERTIES LTD.
NATIONAL TRUST COMPANY LIMITED
NORTH AMERICAN LIFE ASSURANCE COMPANY
OLYMPIA & YORK DEVELOPMENTS LIMITED
ONTARIO HYDRO
ONTARIO MINISTRY OF GOVERNMENT SERVICES
OXFORD DEVELOPMENT GROUP LIMITED
PRUDENTIAL INSURANCE COMPANY OF AMERICA
SCOTIA REALTY LIMITED
SHELL CANADA LIMITED
SIMPSONS LIMITED
SUN LIFE ASSURANCE COMPANY OF CANADA
SUNCOR INC.
THE TORONTO-DOMINION BANK
WELPORT INVESTMENTS LIMITED

Ottawa

A.E. LEPAGE
BELL CANADA
THE CADILLAC FAIRVIEW CORPORATION LIMITED
CAMPEAU CORPORATION
CITY OF OTTAWA
THE GLENVIEW CORPORATION
GLOBE REALTY MANAGEMENT
METCALFE REALTY COMPANY LIMITED
METROPOLITAN LIFE INSURANCE COMPANY
OLYMPIA & YORK DEVELOPMENTS LIMITED
THE PARK LANE HOTEL
PUBLIC WORKS CANADA
REGIONAL REALTY LIMITED
RON ENGINEERING & CONSTRUCTION (EASTERN) LIMITED
THE UNIVERSITY OF OTTAWA

The Ministry of Energy

At a total cost of less than $50,000 a year since 1978, the ministry:

- Co-ordinates the Downtown programs in Toronto and Ottawa using in-house staff
- Hosts annual Energy Forums in Toronto and Ottawa
- Offers on-going technical consultation services
- Provides diverse resource materials, including case studies on energy management techniques in public buildings

Supporting Organizations

These organizations provide free professional advice to corporate participants on energy matters as follows.

Toronto Hydro

- Counsels companies on electricity use
- Publishes case studies
- Conducts electrical consumption analyses
- Performs building energy audits
- Provides program support at Downtown program seminars and workshops
- Serves on Downtown Program Advisory Committee

Ontario Hydro

- Offers consultation with staff specialists
- Operates a technical library, including audio-visual materials
- Performs computer analyses of building energy consumption
- Publishes energy management literature, including case studies profiling conservation techniques in private sector buildings
- Provides electrical energy audits
- Plans energy forums in conjunction with Ministry of Energy
- Serves on Downtown Program Advisory Committee

Consumers' Gas

- Counsels companies on natural gas use
- Publishes case studies
- Performs gas consumption analyses
- Provides program support at Downtown program seminars and workshops
- Serves on Downtown Program Advisory Committee

Association of Heating, Refrigeration & Air Conditioning Engineers (ASHRAE)
(Toronto & Ottawa Chapters)

- Provides local specialized personnel for seminars and workshops
- Serves on Downtown Program Advisory Committee

Building Owners & Managers' Association (BOMA)
(Toronto & Ottawa Chapters)

- Serves on Downtown Program Advisory Committee
- Assists Ministry of Energy in organizing Downtown Energy Forums

Ottawa Hydro

- Counsels companies on electricity use
- Publishes case studies
- Conducts electrical consumption analyses
- Provides program support at Downtown program seminars and workshops
- Serves on Downtown Program Advisory Committee

Ottawa Gas

- Counsels companies on natural gas use
- Publishes case studies
- Performs gas consumption analyses
- Provides program support at Downtown program seminars and workshops
- Serves on Downtown Program Advisory Committee

The Advisory Committee

Comprising representatives from various member firms and organizations, the Downtown Program Advisory Committee:

- Provides practical advice to assist in meeting overall program objectives
- Recommends content for workshops, forums and seminars
- Meets annually to review program achievements
- Recommends participants' annual reporting format for energy savings
- Advises on technical matters, operating procedures and special issues

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The Co-ordinators

Under the Downtown Program, the first step in managing the energy consumption of a building is to appoint one person to concentrate his efforts on monitoring and lowering energy use. The following individuals act as co-ordinators within their organizations.

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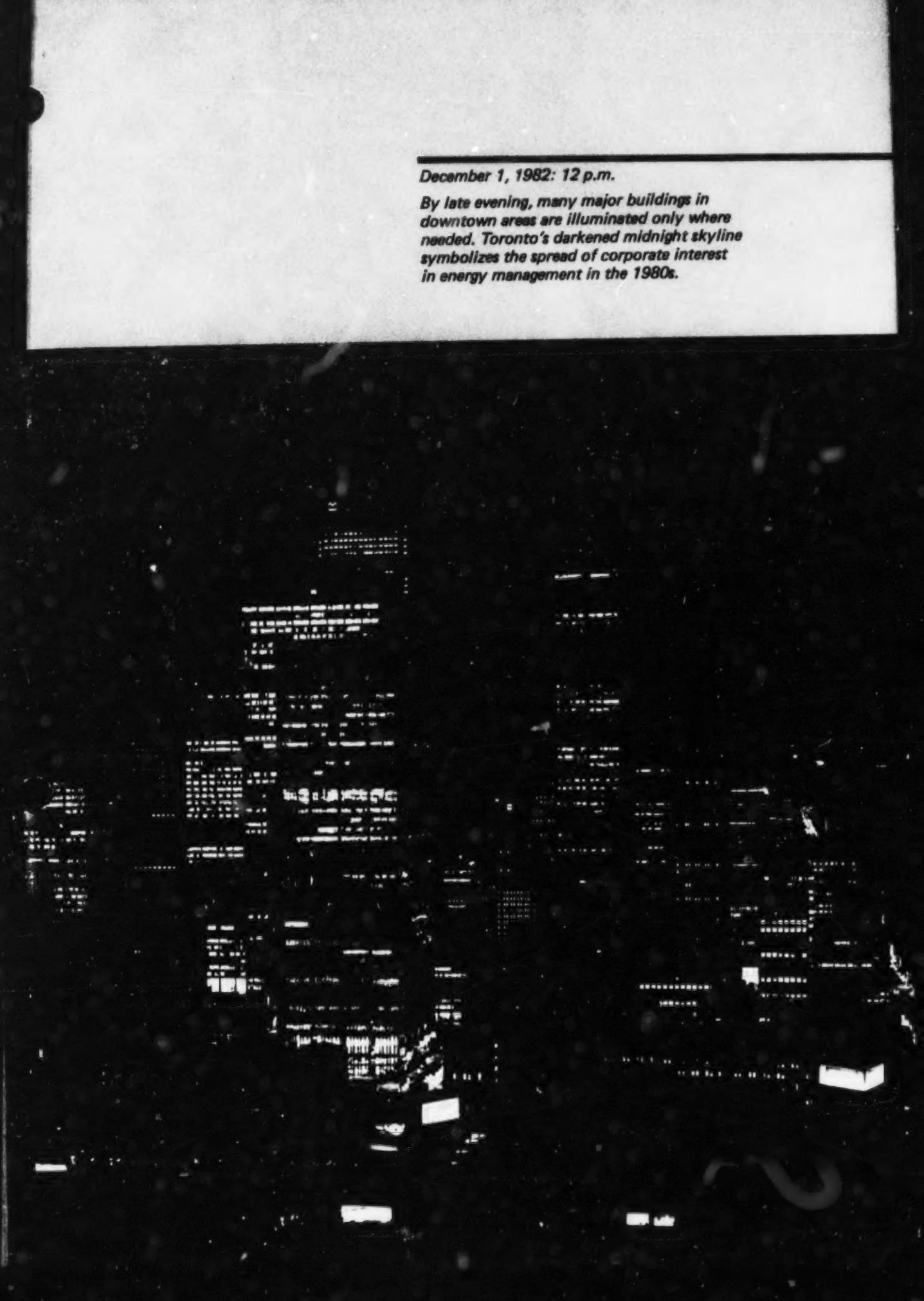

December 1, 1982: 12 p.m.

By late evening, many major buildings in downtown areas are illuminated only where needed. Toronto's darkened midnight skyline symbolizes the spread of corporate interest in energy management in the 1980s.